SDSS Open Cluster Survey (SOCS)

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Czernik-34, SDSS Image

Why Study Clusters?

- Stellar evolution testbed:
  - all stars have the same age, metallicity, distance, reddening;
  - differ in mass.
- Between clusters:
  - Range of ages, metallicities, IMFs;
- They're fun to look at.

Cluster – Research

The Plan

- Area of emphasis of the SEGUE portion of the SDSS-II.
- A wide survey of primarily open stellar clusters which will be used for both science and calibration purposes.
- Include in the initial list of science clusters:
  - a few very young open clusters (star forming regions), and
  - well-characterized clusters to aid in the calibration effort.
- Compare our observations to theoretical isochrones
  - Girardi et al. 2004
  - Clem et al. - in development
- To augment the cluster work, particularly metallicity determinations, we will also observe ~400 field stars with available high resolution determinations of [Fe/H].

The Plan - II

- We have fine-tuned the Galactic longitudes of the SEGUE stripes to support stellar population studies. By combining these stripes with four special scans we target 31 clusters that cover the widest possible range of known metallicities and ages.

- About 12 perpendicular scans in the plan.

- Open clusters were chosen from the WEBDA catalog (Mermilliod 1998) to uniformly sample the grid defined by metallicity (-0.30 < [Fe/H] < +0.30) and age (6.9 < log(years) < 9.9). We added four extremely metal poor clusters and one metal rich cluster.

- Only two of the suggested targets require special pointings.

Background

- Loose group in the US institutions (mostly open clusters)
- Group centered at MPIA (mostly globulars)
- Need a crowded field pipeline to really maximize science return.

- We present some initial open cluster data, collected with several telescopes, using the *u'g'r'i'z'* filter system.
- Our early results illustrate the robustness of the SDSS photometric system and the scientific potential of this project for the SDSS-II.
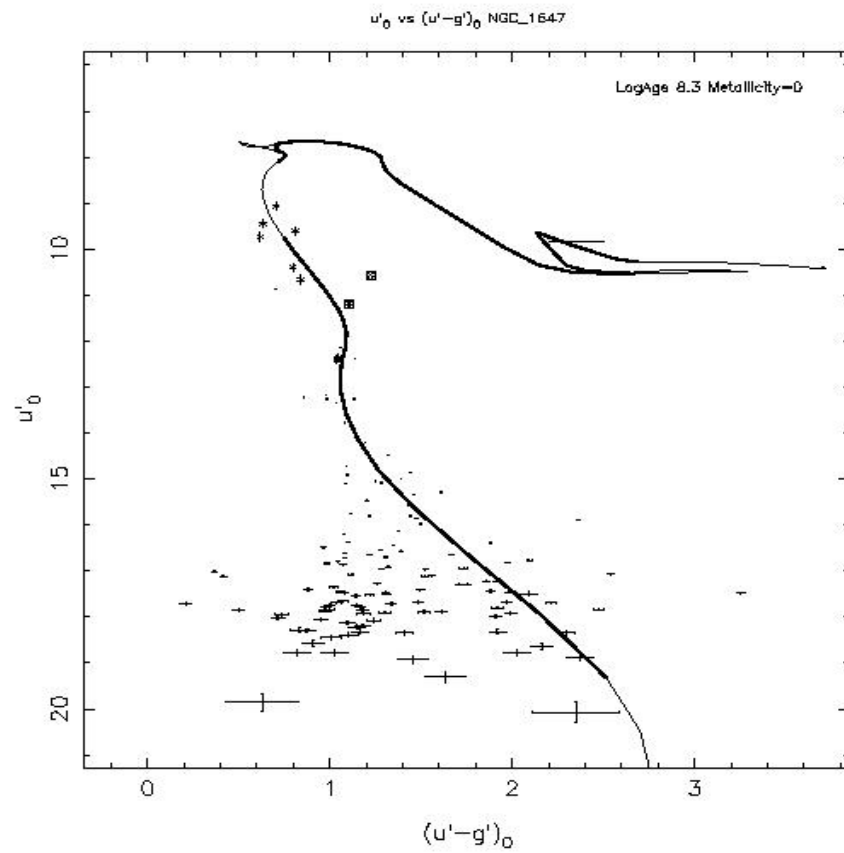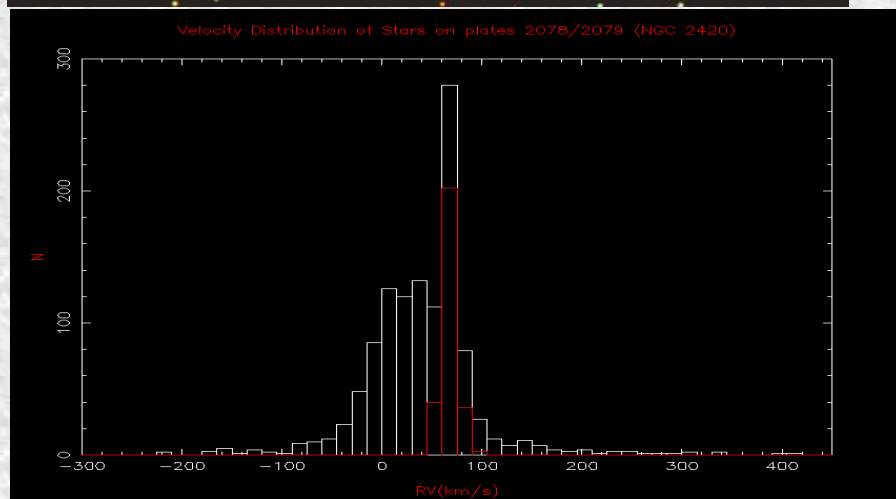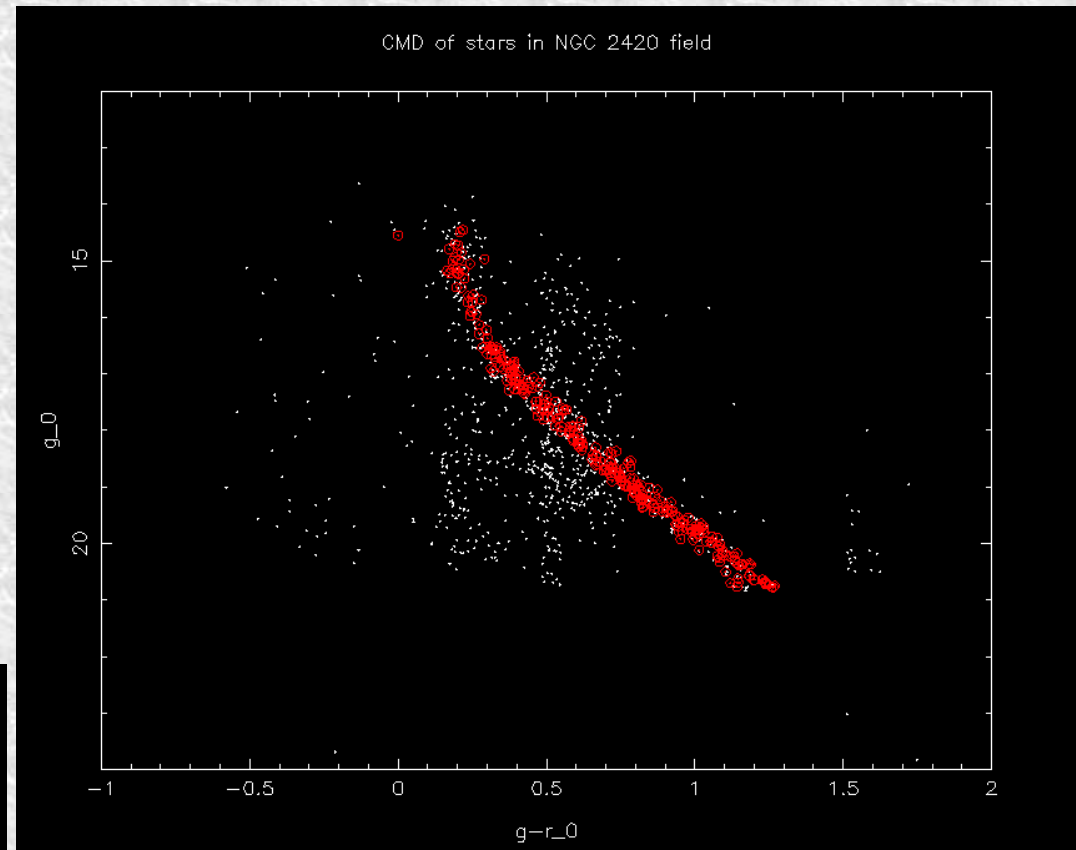
Cluster – Research

NGC-1647
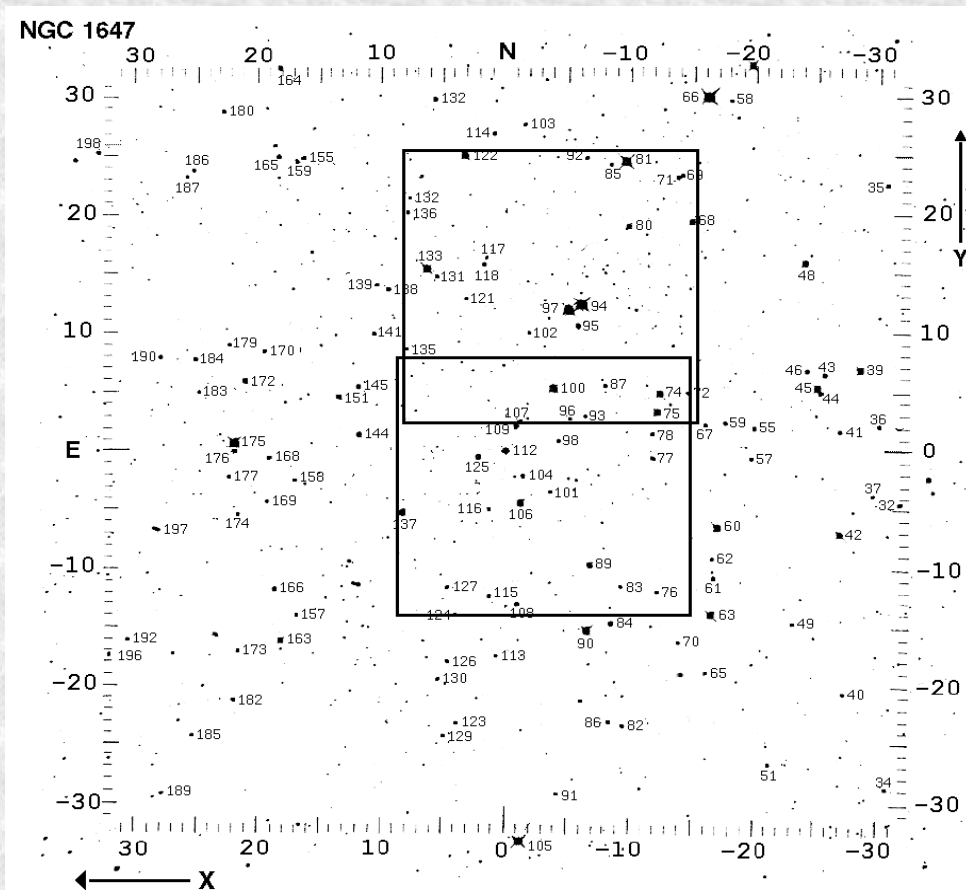
- L – NGC-1647 and the USNO-1m fields of observation.

- BR – CMD for NGC-1647, early fit results.

NGC-2420

- NGC-2420 – KPNO image
- CMD for NGC-2420, early SDSS results.
- Radial velocity distribution – SDSS

CMD of stars in NGC 2420 field

Velocity Distribution of Stars on plates 2078/2079 (NGC 2420)

M-15

- Spectroscopic target selection

- DR3 – finder chart image

M15 targets on plate pair N(bright)= 97, N(faint) = 155

Faint plate cand
Bright plate cand
CMR/JAM PM weight
KMC match

DR3

| Help | Chart | Navi | List | Expl |

Parameters

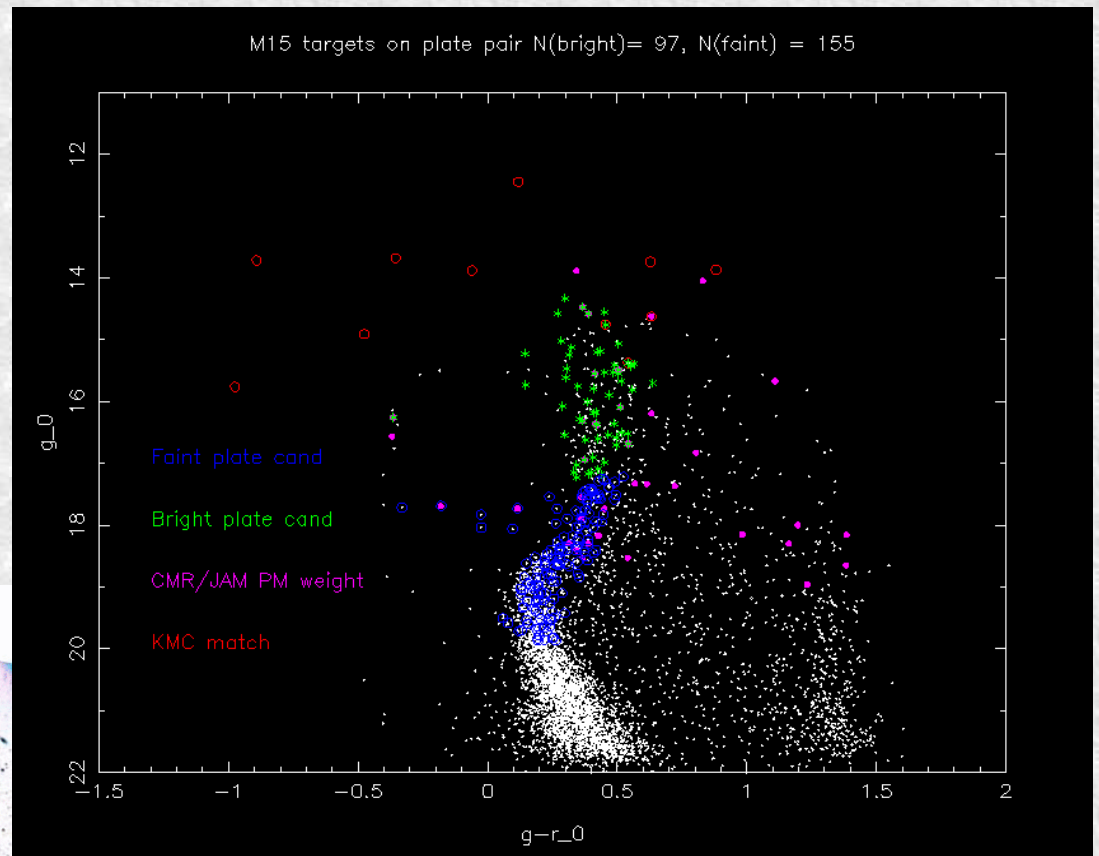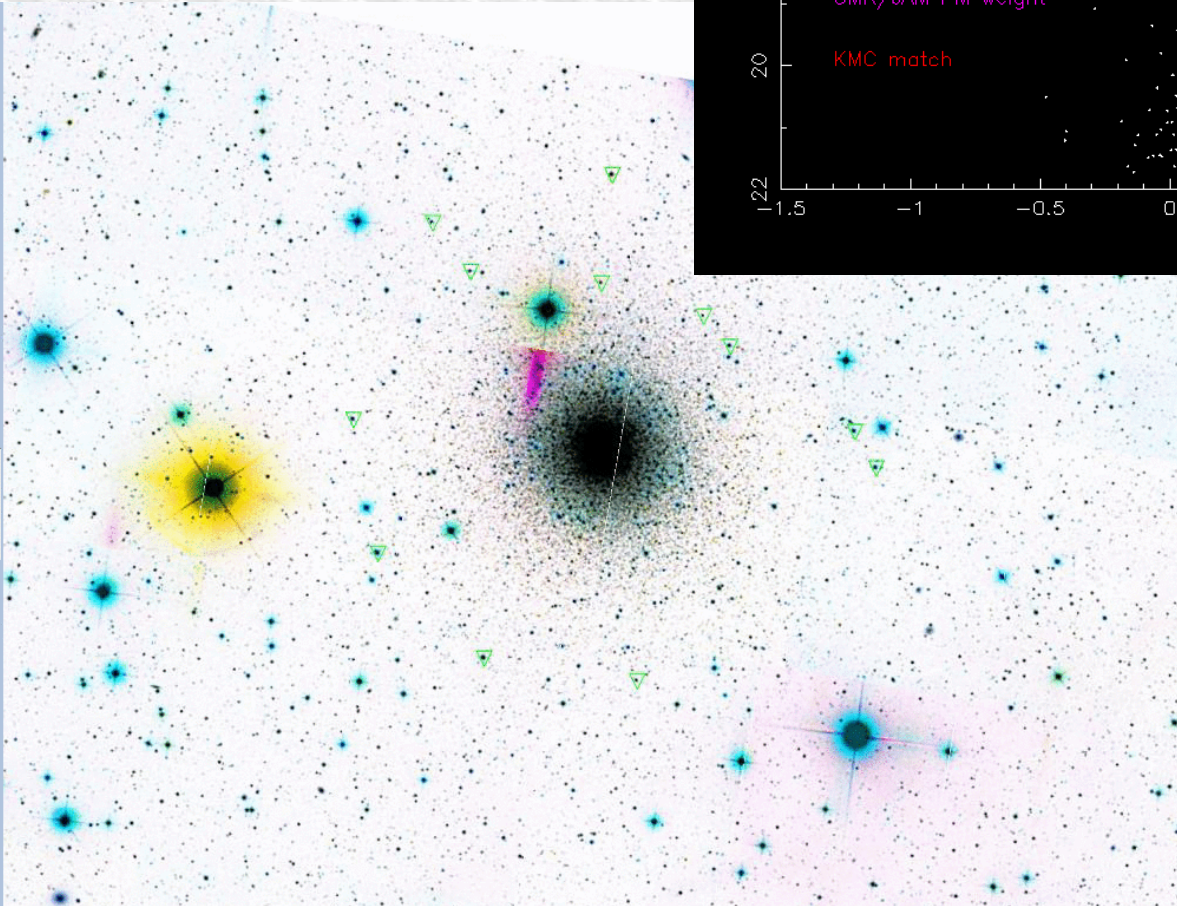| ra | 322.4929 | deg |
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Use query to mark objects

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Drawing options

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☐ SpecObjs
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☐ Fields
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☐ Plates
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Publications

- C.J. Rider et al. "A Survey of Open Clusters in the u'g'r'i'z' Filter System: I. Results for NGC-2548 (M48)," 2004 AJ, 127, 2210.

- D.C. Moore et al. "A Survey of Open Clusters in the u'g'r'i'z' Filter System: II. Results for the Adjoining Clusters NGC-6134 and Hogg-19," 2005 AJ, submitted.

- K.A. Cantrell et al. "A Survey of Open Clusters in the u'g'r'i'z' Filter System: III. Results for NGC-1647," 2005 AJ, in prep.

This is Socks